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In this apparatus there are altogether ninety-six keys, of which seventy-two correspond with small Roman letters, figures, stops, &c., and the remaining twenty-four with the small-caps or capitals, which have reservoirs apart from the rest, and which are placed in the back of the machine.

When in full work as many as 8000 letters, &c. have been set up by this machine in an hour, whereas, by the ordinary mode, a good compositor can, on the average, only set up about 1700 letters in the same time; the wages paid in each case being nearly the same in amount.

## HUGHES'S METALLIC LATH SUN-BLINDS.

These blinds are made either of brass-wire gauze, or iron-wire gauze painted.

The pulley lath is of the ordinary construction, but the movable laths present the novelty for which a license has been granted to Mr. Hughes for three years. Each of the movable laths is made of two thicknesses of the gauze; the upper thickness being lapped over the top edge of the under, with a space between them of about $\frac{3}{10}$ths of an inch. The ends of the laths are bound with brass.

The cost of these blinds, if made of brass-wire gauze, and including the wooden frames, is at the rate of 10*s*. 6*d*. per foot superficial; but if of iron-wire gauze painted, at the rate of 3*s*. 6*d*. per foot superficial.

## ON THE APPLICATION OF ELECTRICITY TO THE TRANSMISSION OF TELEGRAPHIC SIGNALS.

### By the Secretary.

The application of electricity to the transmission of signals by means of Messrs. Cooke and Wheatstone's telegraph is already in daily use on the Blackwall, Edinburgh and Glasgow, and Manchester and Leeds Railways. From the well-known experiments of Professor Wheatstone, it is ascertained that the electric current travels at the rate of 200,000 miles in a second of time; availing themselves of this important property, Professor Wheatstone and Mr. Cooke, who had both been labouring in the same field of extensive usefulness for a long time previously to their being associated as joint patentees of the invention, convinced the scientific world of the truth of their proposition, by laying down their telegraph, in the first instance, on the Great Western Railway, between Paddington and West Drayton, on which line it has been clearly established that electro-telegraphic communications may be transmitted to a distance of seventy-eight miles without any intermediate station. By extensive experiments lately made by Mr. Cooke at his own expense near Blackheath, he is enabled to lay down the telegraph at something like half the original cost, the iron tubing for protecting the wires from injury being dispensed with, and the insulated wires, suspended either from wooden or iron standards, ranged at any convenient intervals along the railway.

The mode of working the Blackwall Railway is of so complicated a nature that it would be impossible, without the aid of this or some other equally efficient system of transmitting communications between all the different officers of the railway, to carry on the traffic with any degree of safety. As it is, millions of passengers have been carried along that line without any accident having occurred worthy of notice.

The signals are given by pointers, each suspended vertically upon an axis moving freely through the face of a dial. Behind the dial a light-bar magnet is fixed on the same axis as the pointer, so that both move together. A portion of the conducting wire is coiled many times round a frame on which the magnet moves, so as to subject the magnet to the multiplied deflecting force of the voltaic current passed through the wire. The motion of the magnet is limited on both sides by fixed stops.

We may suppose three of these very simple instruments included in the same conducting wire, and consequently, an electric current passing through the convolutions of wire surrounding the respective magnets, deflects those magnets with a sudden and decided motion to one of the stops, and causes the pointers to indicate corresponding and simultaneous signals upon the dials of each of the instruments at the Minories, Limehouse, and Blackwall stations.

Each instrument is provided with a battery and a handle, by which a porter or policeman is enabled at pleasure to connect the conducting wire with his battery.

By moving the handle to the right or left, either of the signals can be instantaneously transmitted from any one of the instruments to all the others, which, by means of their own handles, have the power of sending back signals in reply. Correctness is insured by the simultaneous appearance of the signal in the instrument of the operator and that of the recipient. Eight signals can be given by means of the instruments used on the Edinburgh and Glasgow Railways, in each of which there are two needles like those above described. Each needle is worked by its distinct handle.

If the signal answering to No. 1 is to be transmitted, then the two pointers are made to converge upwards at the same instant. If the signal answering either to No. 2 or 3 is required, then the left-hand pointer will effect the object. If the signal corresponding either with 4 or 5 is wanted, then the right-hand pointer is moved towards the one or the other of these figures as may be required.

If the pointers are made to rest diagonally in one direction, the signal corresponding with 6 is indicated, and if in the other, that corresponding with 7 is transmitted. And, lastly, the signal corresponding with 8 is effected by causing the pointers to converge downwards at the same time.

Thus by different arrangements of the figures or letters in the dials any required number of signals may be given.

I now proceed to describe generally the improved mode of conducting the wires, as invented by Mr. Cooke, and introduced by that gentleman on the Great Western Railway.

## COOKE'S IMPROVED ARRANGEMENTS OF THE CONDUCTING ELECTRIC TELEGRAPH.

### (SECOND COMMUNICATION.)

By the Secretary.

On the evening of May 17th, Mr. Cooke's improved practical electric telegraph, as used on the Great Western Railway, was fully described and illustrated by a complete telegraph at work in the Society's rooms, the manipulators being two of the young men who daily work the telegraph on the Blackwall Railway. On the table were placed specimens of the different kinds of wire used, and models of the winding and drawing apparatus, and also of the drawing and intermediate posts; and one of Mr. Cooke's detectors, by which injuries to the wires, &c., may be discovered at any part of the line, though the wires be buried in the earth; diagrams were also exhibited to assist the explanation.

The practical electric telegraph comprises two modes of applying electricity to telegraphic purposes, the "galvanometer form, which acts by the deflecting power of galvanometer coils on magnetic needles," and the "mechanical form which gives its signals through the agency of the electro-magnet on mechanism." Every instrument yet employed may be classed under one or other of these heads.

Mr. Cooke first adopted the plan of laying the telegraph wires in iron tubing on the Great Western Railway; he afterwards laid down a double line on the Blackwall Railway, and others on the Manchester and Leeds, and Edinburgh and Glasgow Railways. This plan, though perfectly successful, was extremely costly and